rior, is inserted after a short course into the posterior region of the bony ring of the sclerotic; the other, covered at its origin in the choroid by the former, is prolonged anteriorly as far as the anterior margin of the bony ring where a portion of the fibres are inserted; whilst the remainder is attached to the membrane of Descemet, the true elastic tendon of the anterior plain of radiated muscular fibre. This is the muscle described by Crampton and others, who, according to Rouget, were deceived as to its origin and true meaning. The muscular apparatus of the iris is only the continuation of the deep plain of the ciliary muscle (circular fibres). In birds, the transversely striated bundles enter the iris obliquely, and, keeping in the course of this membrane a generally circular direction, cross each other more or less obliquely. In man, and most mammalia, the same disposition obtains as in that of the iris of birds. At the anterior edge of the ciliary muscle, the bundles of the deep layer of this muscle, continuing their direction obliquely transverse, penetrate the iris; and then, covering the external surface of this membrane, and entangling the vessels in their meshes, they cross each other more or less regularly, arrive at the edge of the pupil, and form the ring of circular fibres at the surface of the iris, the sphincters. The author then speaks at length of the mechanism of the parts, and of the functions they play in adapting the lens to vision, showing how the contractions of the circular bundles of ciliary muscle force the blood returning from the iris into the ciliary folds, which, by compression, affect the convexity of the lens.

MATERIA MEDICA AND PHARMACY.

6. *Employment of Amylene.*—M. Robert recently read, at the *Academy of Medicine*, an interesting report of a commission, composed of MM. Malgaigne, Velpeau, and himself, upon a memoir on amylene, submitted to the Academy by M. Débout. The report states that M. Débout's paper offers nothing new upon the subject, but confirms the observations already published by Snow, Giraldès, and Tourdes, establishing that amylene produces anæsthesia very speedily, without causing any painful sensation, or inducing that desire to cough, or expectorate, so often observed in the employment of chloroform. "During the entire procedure," says M. Débout, "the pulse remains large, full, and very rapid, the respiratory movements are deep, the skin warm, the face highly coloured. In one word, there is an absence of those signs which indicate that the new agent can readily exert any effect upon the phenomena of organic life."

The reporter, in order to judge of this favourable account of amylene, made a number of trials with it himself, employing Charrière's apparatus, which, by covering both nose and mouth, prevents a loss of the vapour. One of the remarkable properties of amylene being its slight solubility in the blood, its vapour must be breathed in as concentrated a manner, and as continuously as possible, under the risk of failing to produce insensibility, or of this being of too short duration. M. Robert believes that is the want of observing this precaution, and from merely administering it on a sponge, that some surgeons have failed altogether, or have had to employ very large quantities of amylene. He has employed it in 44 adults of both sexes. Most of the operations were but of short duration, such as opening abscesses or panaris, avulsion of nails, or amputation of toes; but some have been of a more important character, such as amputation of the thigh and arm, removal of the breast and of the parotid gland, and extraction of a calculus from the prostatic portion of the urethra, this last requiring a quarter of an hour. In none of these cases was any irritation of the mucous membrane produced. Most of them were rendered insensible in two or three minutes, a few not until six or seven; while in three, after ten or twelve minutes' inhalation had been tried in vain, chloroform had to be resorted to. The agitation which so frequently precedes the action of chloroform was not observed. The countenance became more and more flushed. The eyelids remained widely open, and the fixed eyes were frequently carried upwards, beneath the upper lid. The head was thrown backwards, and sometimes the limbs became extended and stiffened. The pulse very rapid, and, in one case, its intermittent and filiform character excited alarm. Respiration continued free, and the spasmodic closure of the jaws, with threatened suffocation, sometimes observed under chloroform, was never met with. It is an important fact, that amylene never gives rise to muscular resolution, and the insensibility it induces is of very short duration, unless the application be constantly repeated. After the operation, the restoration is rapid, the patient not continuing to suffer any uneasiness. Two young girls, however, exhibited a singular form of delirium, accompanied by sobbing and violent convulsive movements. One of them, subjected some time after to chloroform, exhibited the same symptoms. Thus, while amylene resembles ether and chloroform in its power of preventing pain, it differs from them in the rapidity and temporary duration of its action, and in not exerting any power in muscular contractility.

As to the question of danger, M. Robert observes that Dr. Snow's case has proved that, as in the use of chloroform, death may take place in consequence of a special predisposition of the economy of an unknown nature. The only question really is, whether there is less danger attaching to the employment of amylene. From various experiments he has performed upon animals, M. Débout concludes that there is; and he calculates that, if the dose of chloroform has to be doubled, to convert it from an anæsthetic into a toxical agent, that of ether has to be quadrupled, and that of amylene to be quintupled. The reporter, having repeated the experiments upon birds and rabbits, believes that this statement is accurate. Performing other experiments upon dogs, employing for that purpose a modification of Charrière's apparatus, he found that chloroform gave rise to the usual series of symptoms, from simple insensibility to complete muscular resolution, the animals always dying in the course of thirty or forty minutes. Under the use of amylene, the same symptoms were observed as in man, but a relaxation of the muscles was never attainable. Moreover, continuing the experiment, with the intention of killing the animals, these seemed to become habituated to its use, and recovered part of their sensibility. The inhalation was terminated at the end of an hour, and the animals soon began to walk, and were speedily restored. Having contrived an apparatus by which large quantities of amylene could be breathed in a concentrated form, the reporter at last succeeded in producing complete resolution of the limbs, and death followed in twenty minutes. While these experiments show that amylene is a much less powerful poisonous agent than chloroform, the reporter does not agree with M. Débout that it may, therefore, be more safely used in practice. It is, in fact, a leading point in the history of anæsthetics, that death has not supervened in man upon a successive and progressive evolution of the phenomena of intoxication, but that it occurs suddenly and unexpectedly, and in consequence of an unknown predisposition of the economy.

Amylene is, therefore, but another anæsthetic agent, to be placed side by side with ether and chloroform. Its action is prompt and of short duration, while its effects rapidly disappear. It is to be preferred in very short operations, when we wish simply to prevent or moderate the pain. Moreover, its not exciting irritation of the air-passages renders it a valuable agent when pulmonary lesions exist. It does not, too, give rise to vomiting or nausea, which are not infrequent after chloroform. This is important, especially in relation to children, enabling us to operate nearer their meal-time, and avoid the inconvenience of submitting them to long fasting, which they support very badly: nevertheless, vomiting does occur occasionally.

As the insensibility produced is of such short durability, and muscular contractility is only exceptionally influenced by it, amylene should not be employed for long and difficult operations, and especially those in which it is requisite to subdue the contractility of the muscles, as in dislocations, hernia, the diagnosis of abdominal tumours, etc. M. Tourdes has stated that muscular resolution may at last be obtained by a sufficient prolongation of the anæsthesia; but independently of the inconvenience that might result from the absorption of such large quantities of amylene, and the troublesome uncertainty the surgeon is kept in, respecting the return to consciousness of his patient, it is by no means proved that such resolution would ensue upon a multiplication of the doses. Moreover, the reporter's experiments would seem to show that such repetition, providing the dose be not rendered excessive, tends to destroy the activity of the agent; while, when resolution was obtained, it was only shortly before death.—*Bull. de Thérap.*, May, p. 443.

M. Velpeau, as a member of the Committee, observed that he was no great partisan of amylene, and does not think, so far as his own experience goes, that it is likely to displace chloroform. Against its employment are its detestable smell, alike annoying to operator and patient, the little constancy of its effects, and the necessity of employing an apparatus. As to chloroform, he believes that the amount of danger attending its use has been grossly exaggerated. During the ten years he has employed it in from 5 to 6,000 cases, for operations at different ages, and in both sexes, he has met with no accident whatever. No important accident has, indeed, occurred at any of the great Paris Hospitals. Moreover, how unjust, whenever a death occurs during or after an operation, to attribute it to chloroform! Employed with precautions, he does not regard it as a bit more dangerous than amylene, while it may be administered without any apparatus.

M. Giraldes, at a subsequent meeting of the Academy (*Gaz. Méd.*, No. 21), gave a further account of his experience, having used amylene in the cases of seventy-nine children, varying from one to fourteen years of age, two drachms being in most cases the quantity employed. The time required for the production of the anæsthesia is usually about three minutes, but it varies much, both in different persons and in the same individual. No ill consequence has resulted, the anæsthesia taking place without reaction, or convulsions. In eight cases, muscular rigidity was observed; and when this occurs, the inhalations should be suspended a while, and free respiration permitted. In six cases vomiting occurred. The anæsthesia lasted for a very short time, but it may continue for eight or ten minutes, and is easily kept up. Chloroform is a more powerful agent, but it is also a more dangerous one. It may throw feeble children into a state of cadaveric resolution; and the anæsthesia it induces is often so prolonged as to endanger life. On other occasions it induces spasmodic closure of the jaws, rigidity of the muscles of the neck and thorax, and all the symptoms of asphyxia, rendering artificial respiration necessary. It generally gives rise to vomiting, or other signs of irritation of the digestive organs. After the employment of amylene sensibility rapidly returns, and the children seem in nowise to suffer from it. It may be given soon after meals, and to enfeebled children, in whom chloroform would prove dangerous. It thus has, like chloroform, its special indications, and frequently presents indubitable advantages.

Dr. Kadlburger (*Wien Wochenschrift*, No. 19) relates the results of his experience of the employment of amylene in seventy-two cases of tooth-extraction, he applying it by means of a sponge to both mouth and nostrils. He states that the amylene he employs emits a smell of over-ripe pears, and is nowise irritating to the respiratory organs. From one to one and a half minute inhalation suffices for this purpose. The falling of the uplifted arm, as if wearied, is the signal for the discontinuance of the inhalation. No abnormal muscular movements, or closure of the jaw were produced. The patient readily opened the mouth upon being requested to do so; and during the extraction, most persons retained the consciousness of the application of the instruments. The pain, when felt at all, was very slight, and never at all approaching to the torture attendant upon ordinary tooth-drawing.

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7. *Anæsthetic Action of Carbonic Oxide.*—Dr. Ozanam considers that the results hitherto obtained by the use of anæsthetic agents concur to demonstrate the truth of the law that the whole series of carbonized bodies, volatile or gaseous, are endowed with anæsthetic power, and that they possess this power